Claims

1. A filling level sensor comprising

a tunable electrical resonant circuit,

a mechanical oscillator that can be excited to resonance oscillation by the resonant circuit, and

a control circuit for tuning the resonant circuit to a resonance frequency of the mechanical oscillator, comprising a device for comparing the amplitude and/or frequency of the mechanical oscillator with a value, and for detecting a malfunction of the mechanical oscillator if its amplitude and/or frequency deviates from this value in the prescribed manner.

2. A filling level sensor according to claim 1, wherein the control circuit comprises a PLL.

3. A filling level sensor according to claim 1 or 2, further comprising a mechanical-electrical transducer for the purpose of providing a signal proportional to the amplitude of the mechanical oscillator, and wherein the device for comparing comprises a threshold circuit, which receives the signal supplied by the transducer and suppresses it if its amplitude falls below the minimum value.

4. A filling level sensor according to claim 3, wherein the threshold circuit is a Schmitt trigger.

5. A filling level sensor according to claim 1, further comprising a mechanical-electrical transducer for supplying a signal that is proportional to the amplitude of the mechanical oscillator to the control circuit by way of a signal line and further comprising a high-pass filter positioned between the transducer and the control circuit in the signal line.

6. A filling level sensor according to claim 2, further comprising a mechanical-electrical transducer for supplying a signal that is proportional to the amplitude of the mechanical oscillator to the control circuit by way of a signal line and further comprising a high-pass filter positioned between the transducer and the control circuit in the signal line.

7. A filling level sensor according to claim 3, further comprising a mechanical-electrical transducer for supplying a signal that is proportional to the amplitude of the mechanical oscillator to the control circuit by way of a signal line and further comprising a high-pass filter positioned between the transducer and the control circuit in the signal line.

8. A filling level sensor according to claim 4, further comprising a mechanical-electrical transducer for supplying a signal that is proportional to the amplitude of the mechanical oscillator to the control circuit by way of a signal line and further comprising a high-pass filter positioned between the transducer and the control circuit in the signal line.

9. A filling level sensor according to claim 1, wherein the electrical resonant circuit is connected to an electrical-mechanical transducer that drives the mechanical oscillator by way of a low-pass filter.

10. A filling level sensor according to claim 2, wherein the electrical resonant circuit is connected to an electrical-mechanical transducer that drives the mechanical oscillator by way of a low-pass filter.

11. A filling level sensor according to claim 3, wherein the electrical resonant circuit is connected to an electrical-mechanical transducer that drives the mechanical oscillator by way of a low-pass filter.

12. A filling level sensor according to claim 4, wherein the electrical resonant circuit is connected to an electrical-mechanical transducer that drives the mechanical oscillator by way of a low-pass filter.

13. A filling level sensor according to claim 5, wherein the electrical resonant circuit is connected to an electrical-mechanical transducer that drives the mechanical oscillator by way of a low-pass filter.

14. A filling level sensor according to claim 9, wherein the electrical-mechanical transducer is a piezo element and the low-pass filter is formed by a resistor wired in series to the piezo element and the intrinsic capacity of the piezo element.

15. A filling level sensor according to claim 10, wherein the electrical-mechanical transducer is a piezo element and the low-pass filter is formed by a resistor wired in series to the piezo element and the intrinsic capacity of the piezo element.

16. A filling level sensor according to claim 11, wherein the electrical-mechanical transducer is a piezo element and the low-pass filter is formed by a resistor wired in series to the piezo element and the intrinsic capacity of the piezo element.

17. A filling level sensor according to claim 12, wherein the electrical-mechanical transducer is a piezo element and the low-pass filter is

formed by a resistor wired in series to the piezo element and the intrinsic capacity of the piezo element.

18. A filling level sensor according to claim 13, wherein the electrical-mechanical transducer is a piezo element and the low-pass filter is formed by a resistor wired in series to the piezo element and the intrinsic capacity of the piezo element.

19. A process for detecting a malfunction in a filling level measurement system with a filling level sensor comprising a tunable electrical resonant circuit, a mechanical oscillator that can be excited to resonance oscillation by the resonant circuit, and a control circuit for tuning the resonant circuit to a resonance frequency of the mechanical oscillator, comprising

storing an ideal frequency-amplitude progression of a correct filling process as a reference measurement, and

detecting a prescribed deviation from this ideal frequency-amplitude progression as a malfunction.

20. A process according to claim 19, wherein filling the tank with wrong bulk goods is detected as a malfunction.